Kwame Nkrumah University of
Science & Technology, Kumasi, Ghana

ASSOCIATION BETWEEN PLANTAR ARCH INDEX AND WEIGHT

JOSEPH ANAAM

INTRODUCTION

- **Morphology of the foot**
  (Moore and Dalley, 2006; Sinnatamby, 2006; Pranati *et al.*, 2017)

- **Factors that affect foot morphology**
  (Ukoha *et al.*, 2013)

- **Weight of the body**

PRESENT STUDY

- **Studies between BMI, plantar arch index and flat foot**
  (Tsung *et al.*, 2003; Fessler *et al.*, 2005)

- **Limited knowledge in this field**

- **Generation of baseline data for Ghanaians**

AIM

To determine a direct relationship between plantar arch index and weight of Ghanaians.

SPECIFIC OBJECTIVES

- **To measure the weight of participants.**
- **To determine the plantar arch index of males and females.**
- **To find the correlation of plantar arch index and weight.**
- **To compare the data obtained in the present study with other populations.**

MATERIALS AND METHODS

- **Study design**
- **Location: Anatomy Department – SMD, KNUST**
- **Sample size: 287 (62 % males and 38 % females)**
- **Age range: 16 – 34 years (mean age: 19.64 ± 2.02)**

MATERIALS AND METHODS

- **Duration: September 2018 – April 2019**
- **Informed participant consent and Ethics Committee's approval**
- **Inclusion and exclusion criteria**
- **Data analysis – SPSS version 20.0**

MATERIALS AND METHODS

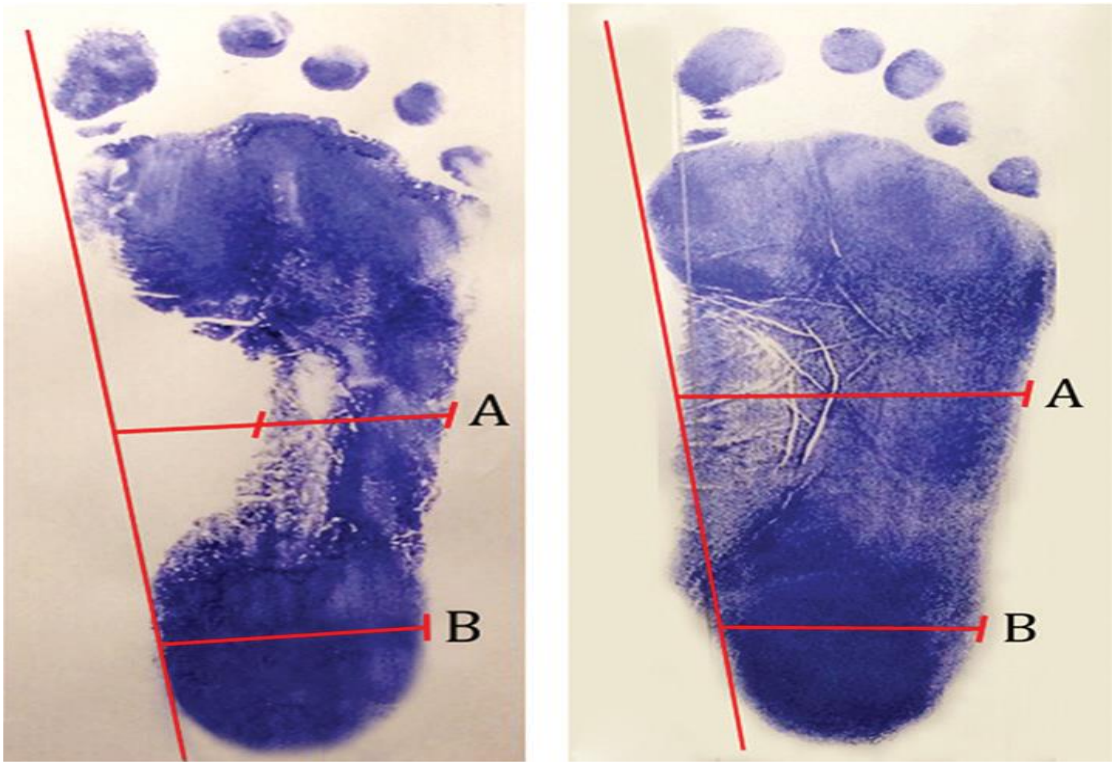

Figure 1: A diagram showing measurement of plantar arch index on footprint. (Rithanya *et al.*, 2018)

- **Plantar arch index calculation**

RESULTS AND DISCUSSION

TABLE 1: DESCRIPTIVE STATISTICS OF RIGHT AND LEFT PLANTAR ARCH INDICES

Plantar arch index	Sex	N	Mean ± SD (cm)	Range (cm)	Between sex (P – value)	Within sex (P – value)
Left	M	178	0.77 ± 0.21	0.30 –1.43	0.06	
	F	109	0.72 ± 0.23	0.22 – 1.39		
	T	**287**	**0.75 ± 0.21**	**0.22 – 1.43**		
Right	M	178	0.80± 0.22	0.37 – 1.41	0.01	0.003
	F	109	0.72 ± 0.23	0.30– 1.48		0.807
	T	**287**	**0.77 ± 0.22**	**0.30 – 1.48**		**0.029**

***N** = Sample size, **SD** = Standard Deviation, **p** = probability, **M** = Male, **F** = Female, **T** = Total, Statistically significant difference ($p < 0.05$).*

(Consistent with Chinedu *et al.*, 2017 and Krupa *et al.*, 2015 but not Hernandez *et al.*, 2007)

RESULTS AND DISCUSSION

TABLE 2: WEIGHT OF THE PARTICIPANTS STRATIFIED BY SEX

Weight	N	Mean ± SD (cm)	Range (kg)	p - value
Total participants	**287**	**64.53 ± 11.36**	41 - 110	
Males	178	64.92 ± 10.58	45 - 109	**0. 46**
Females	109	63.90 ± 12.56	41 - 110	

***N** = Sample size, **SD** = Standard Deviation, **p** = probability, Statistically significant difference (p < 0.05).*

RESULTS AND DISCUSSION

TABLE 3: CORRELATION BETWEEN PLANTAR ARCH INDEX AND WEIGHT

Plantar arch index	Sex	Weight	
		r - value	**p - value**
Left foot	M	0.196	0.009
	F	0.182	0.058
	T	**0.193**	**0.001**
Right foot	M	0.189	0.012
	F	0.148	0.125
	T	**0.175**	**0.003**

r *= Pearson correlation,* ***p*** *= probability, statistically significant difference,* ***M*** *= male,* ***F*** *= female,* ***T*** *= total number of participants.*

(Consistent with Nairrita *et al.*, 2017)

RESULTS AND DISCUSSION

TABLE 5: INTER-POPULATION COMPARISON OF THE LEFT AND RIGHT PLANTAR ARCH INDEX

	Left plantar arch index				Right plantar arch index			
	Sex	**Mean ± SD (cm)**	**t - test**	**p - value**	**Sex**	Mean **± SD (cm)**	t - value	P - value
Present study Ghanaians	M	0.77 ± 0.21			M	0.85 ± 0.22		
	F	0.77 ± 0.22			F	0.72 ± 0.23		
Nigerians	M	0.83 ± 0.17	-4.135	0.000	M	0.84 ± 0.19	-2.745	0.007
	F	0.82 ± 0.18	-4.972	0.000	F	0.82 ± 0.19	-4.578	0.000
Brazilians	M	0.62 ± 0.25	9.281	0.000	M	0.67 ± 0.27	-7.742	0.000
	F	0.61 ± 0.27	5.090	0.000	F	0.66 ± 0.24	2.801	0.000
Malaysians	M	0.85 ± 0.27	-5.412	0.000	M	082 ± 0.24	-1.511	1.133
	F	0.84 ± 0.23	-5.930	0.000	F	0.81 ± 0.21	-4.116	0.000

***SD** = Standard deviation, **t** = t-statistic; **p** = probability, Statistically Significant Difference (P < 0.05), **M** = male, **F** = female, **T** = total number of participants*

CONCLUSION

- **Males were slightly heavier than females but the difference was not statistically significant.**

- **Also, males recorded significantly higher plantar arch index than their female counterparts.**

- **There was a positive but weak significant correlation between plantar arch index and weight.**

CONCLUSION

- **Therefore, plantar arch was not a useful model for weight estimation in the present study.**

- **The plantar arch index of Ghanaians differed significantly from that of Nigerians, Brazilians and Malaysians.**

FUTURE WORK

- **Larger sample size with equal proportions of males and females should be used to reduce sex bias and increase prediction accuracy.**

- **Different methods for determining plantar arch index should be put into consideration.**

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THANK YOU